

From: [Openchowski, Charles](#)
To: [Lynch, Mary-Kay](#); [Michaud, John](#)
Subject: FW: Review of West Lake Landfill Draft Work Plans
Date: Monday, July 29, 2013 10:46:00 AM
Attachments: [rrb Westlake work plans 12.19.12.docx](#)

I haven't seen the "Board's" final 2/13 consultation memo (since it wasn't circulated to the Board) – I will ask Doug for it ... thanks

From: Ammon, Doug
Sent: Monday, July 29, 2013 11:44 AM
To: Gravatt, Dan
Cc: Legare, Amy; Openchowski, Charles; Asher, Audrey
Subject: FW: Review of West Lake Landfill Draft Work Plans

Dan,

The attached memo from Charles is not necessarily consistent with the Board's final February 2013 consultation memo since it cites earlier drafts. We probably should have an internal call to figure out the substance of the review comments and a path forward.

From: Doug Ammon [<mailto:Ammon.Doug@epamail.epa.gov>]
Sent: Monday, July 29, 2013 10:35 AM
To: Ammon, Doug
Subject: Fw: Review of West Lake Landfill Draft Work Plans

Douglas Ammon, P.E.
Chief, Site Assessment and Remedy Decisions Branch
Superfund Program U.S. EPA Mail Code 5204P
1200 Pennsylvania Ave. N.W.
Washington DC 20460
703-347-8925
703-927-3971 (cell)
----- Forwarded by Doug Ammon/DC/USEPA/US on 07/29/2013 10:35 AM -----

From: Charles Openchowski/DC/USEPA/US
To: Doug Ammon/DC/USEPA/US@EPA
Cc: David Bartenfelder/DC/USEPA/US@EPA, Helen Dawson/DC/USEPA/US@EPA, Ron Wilhelm/DC/USEPA/US@EPA, Stuart Walker/DC/USEPA/US@EPA, John Michaud/DC/USEPA/US@EPA
Date: 12/20/2012 05:28 PM
Subject: Re: Review of West Lake Landfill Draft Work Plans

Hi Doug, thanks for your email below. We wanted to get back to you by the 20th as you asked, and have tried hard to be as comprehensive as possible in the attached document, given our crowded schedules, the amount of time we had to review, the complexities of the site, and its long history.

The four of us have had several phone conversations and met in person to go over the four draft work plans attached below. Since the four of us are members of the Remedy Review Board and/or participated in the RRB review of the Westlake site in late February this year, we looked at these work plan documents guided by the comments and recommendations prepared by the Board in various

versions coordinated with all members between February and May of this year, while the meeting was still fresh in everyone's mind. Since I often help Board members put their comments and recommendations into writing, I volunteered to do the same here.

Each of the work plan documents below refers to the October 12, 2012 letter from Region 7 (also attached to your email), which in turn refers to various Board recommendations and/or positions. Since we are not aware of, and have not seen, a final Board document containing recommendations for this site, we are not sure exactly what the October 12, 2012 letter is based on.

Also, we will be happy to take a look at the work plans on "Alternative Landfill Cap Designs" and "Fate and Transport Modeling" when they come in. We noticed that a number of issues discussed by the Board at the meeting and in draft Board memos (like ARARs, for example) don't seem to be addressed by the four work plans below, but realize they may be addressed in the two that are still in the works.

Please let us know if you have any questions, we'd be happy to discuss these further. thanks

(See attached file: rrb Westlake work plans 12.19.12.docx)

▼ Doug Ammon---12/06/2012 03:08:35 PM---Please find attached 4 draft work plans for additional analysis for the West Lake Landfill and other

From: Doug Ammon/DC/USEPA/US
To: Stuart Walker/DC/USEPA/US@EPA, Charles Openchowski/DC/USEPA/US@EPA, David Bartenfelder/DC/USEPA/US@EPA, Ron Wilhelm/DC/USEPA/US@EPA
Cc: Helen Dawson/DC/USEPA/US@EPA
Date: 12/06/2012 03:08 PM
Subject: Review of West Lake Landfill Draft Work Plans

Please find attached 4 draft work plans for additional analysis for the West Lake Landfill and other background information. I would appreciate any comments and suggestions concerning these work plans by December 20th and I will forward them to Region 7. In addition, work plans on "Alternative Landfill Cap Designs" and "Fate and Transport Modeling" are expected in the near future. Thanks.

[attachment "Additional Work letter to PRPs for SSFS.pdf" deleted by Charles Openchowski/DC/USEPA/US] [attachment "Work Plan - Apatite Technology.pdf" deleted by Charles Openchowski/DC/USEPA/US] [attachment "Work Plan - Discount Rate.pdf" deleted by Charles Openchowski/DC/USEPA/US] [attachment "Work Plan- Alternative Area 2 RIM Volume.pdf" deleted by Charles Openchowski/DC/USEPA/US] [attachment "Work Plan - Partial Excavation 12-4-12.pdf" deleted by Charles Openchowski/DC/USEPA/US] [attachment "WestLakeLandfillFSUpdateNovember2012-1.pdf" deleted by Charles Openchowski/DC/USEPA/US]

Douglas Ammon, P.E.
Chief, Site Assessment and Remedy Decisions Branch
Superfund Program U.S. EPA Mail Code 5204P
1200 Pennsylvania Ave. N.W.
Washington DC 20460
703-347-8925
703-927-3971 (cell)

West Lake Landfill Work Plans

1. Work plan on Partial Excavation Alternative.
 - a. “Introduction”

An approach that relies on the following language is likely to lead to a result that is inconsistent with the Board’s comments and recommendations: “To implement this directive, Respondents therefore need to use the same criteria that were used to define the FS Partial Excavation Alternative to define the scope of the Partial Excavation with Off-Site Disposal Alternative and Partial Excavation with On-Site Alternative requested in EPA’s Letter (“Partial Excavation Alternatives”) -- that is, the presence of radionuclides with activity levels greater than 1,000 picocuries per gram pCi/g or the presence of downhole gamma readings greater than 500,000 counts per minute (cpm).”

The Board did not use, rely, or support “the presence of radionuclides with activity levels greater than 1,000 picocuries per gram pCi/g or the presence of downhole gamma readings greater than 500,000 counts per minute (cpm)” as a metric for anything at this site; in fact, the Board did discuss and refer to “HQ guidance provided to evaluate potential PTW at this site (e.g., “material with concentrations at or exceeding 79 pCi/gr of radium 226 and 228 combined, or 79 pCi/gr of thorium 230 and 232 combined”).“

As a related matter, the Board’s initial observations/comments/recommendations included the following statements: 1) “Why wasn’t removal of top couple of feet of dirt to extract hotspots (or range of depths w/ performance measures to support iterative process) considered with cap placement over what remains?” 2) “The Board notes that the 1982 NRC Radiological Survey states that 1) the representation of subsurface contamination based on auger hole measurements in Figures 15 – 19 of that report “are consistent with the operating history of the site, which suggests that the contaminated material was moved onto the site within a few days’ time and spread as cover over fill material. Thus, one would expect a fairly continuous, thin layer of contamination, as indicated by survey results.” (p. 16). The Board also notes that the most intense gamma peak readings for RIM in Area 2 are located within three feet of the surface (e.g., PVC 7, PVC-10, PVC-11); see Table 6-9 of RI report.” 3) “The Board notes that Table 6-8 in the RI indicates that the estimated average total thickness of RIM for Area 1 is 3.37 ft, and 3.73 for Area 2; this is further supported by Table 5 attached to the 1982 NRC report. The RI report also indicates that “Based upon the radiological data, McLaren/Hart concluded that the zone of radiological impacts in Area 1 is generally a thin layer (5-feet thick or less) in the upper part of the landfill debris” (page 32) and “Based upon the radiological data, McLaren/Hart concluded that the zone of radiological impact in Area 2 is generally a thin layer (less than 5 feet) in the upper part of the landfill debris” (page 33). This conclusion is similar to the one made by the NRC in its 1982 Radiological Survey that the deposits appear to form “a fairly continuous, thin layer of contamination, as indicated by survey results (page 16) and “a contiguous layer” (page 21), reflected also in Figures 10 – 19 attached to that report which include a number of cross-

section diagrams.” 4) “Also, the Board notes that the RI report states that “Based upon the results of the downhole gamma logging and the laboratory analyses, radiologically impacted materials were generally found at depths ranging between 0 to approximately 6 feet in the northern portion of Area 2” and “In the southern part of Area 2, radiologically impacted materials were identified at depths generally ranging between 0 and 6 feet.” (RI page 97).” 5) “The Board recommends that the Region develop an alternative that reflects an approach which surgically removes the RIM, which appears to be a discrete, reachable source term that will continue to increase in toxicity over hundreds and thousands of years, in a calibrated manner using performance standards for the excavation process that excludes material not contaminated by the RIM (e.g., construction debris in the overburden material). In addition the Board recommends that the Region develop an alternative that would utilize construction of an engineered cell (even if one would not be located on-site but in the vicinity), as well as disposal of the RIM at Weldon Springs (where other Latty Avenue radioactive waste was disposed of).”

b. “Approach”—

The work plan says: “Specifically, excavation and final grading plans will be prepared for the Partial Excavation Alternatives based on the criteria listed above.” For the reasons explained above, using the “criteria listed above” does not reflect the Board’s expressed concerns.

The work plan also says: “The thickness of cover material necessary to provide protection against gamma radiation and radon emissions under the Partial Excavation Alternatives will be calculated using the same approach as was used in the SFS for evaluation of the cover thickness for the ROD-selected remedy.” The Board did make a number of comments concerning a cover or cap at this site, including: 1) “Both of these landfill designs as a preferred remedy has shortcomings for rim waste alone and in a humid region. A comparison of various landfill capping designs addressing both humid region conditions and long term protection from rim (1000 years) would be an important concept for the preferred remedy. However, the package did not appear to include alternative cap designs, i.e., EPA landfill cap guidance design, existing cap designs for similar rim Weldon Springs), or evapotranspiration cover cap system designs (OSWER Fact Sheets: EPA 5420F-03-015, 2003; EPA 542-F11-001, 2011). For example; a Subtitled C/UMTRCA hybrid may be suitable for both long term infiltration management and radiation shielding protection, The Board recommends that the region include in its remedy selection process evaluations of cap designs similar, but not limited to the above conditions and guidances.” 2) “The package presented to board described the preferred remedy as a hybrid cap/cover design incorporating both Subtitle D and UMTRCA cover design features applied to an existing unlined landfill. However, the package lacked sufficient information on the long term protectiveness of the preferred remedy. Specifically, how the preferred remedy remains protective given the increasing daughter ingrowth concentrations of radium 226/228, radon 222, and the increase in toxicity over time (1000 years).” 3) “Thus, the Board questions the appropriateness of using regulatory standards designed for municipal solid waste for RIM at levels currently measured at 57,300 pCi/gr (page 44 of the package), and expected to peak at

over 700,000 pCi/gr, as ARARs, especially where Areas 1 and 2 were not permitted as subtitle D landfills or licensed as an NRC facility. The Board is not aware of other sites where subtitle D standards have been considered as the correct benchmark for management of waste like the RIM at this site.” 4) “The packaged presented to the board indicated that the preferred remedy alternative was based on a Subtitle D/UMTRCA Hybrid cap design. Each of these landfill designs as a preferred remedy has shortcomings for rim waste alone and in a humid region. A comparison of various landfill capping designs addressing both humid region conditions and long term protection from rim (1000 years) would be an important concept for the preferred remedy. However, the preferred remedy package did not appear to include related cap designs, EPA landfill cap guidance, or existing cap remedies for similar rim. For example; a Subtitle C/UMTRCA hybrid may be suitable for both long term infiltration management and radiation shielding protection, evaluation of recent evapotranspiration cover cap system designs (OSWER Fact Sheets: EPA 5420F-03-015, 2003; EPA 542-F11-001, 2011) are important cap design concepts, and review of the existing DOE cover cap design at Weldon Springs for similar rim and climatic conditions may be useful in such a comparison. The Board recommends that the region include in its remedy evaluations cap designs that reflect the above conditions and guidances but not necessarily be limited to these examples, in order to ensure all potential alternatives are fully evaluated for purposes of cost, implementability, and other factors.” Since the Board expressed concern about the proposed approach taken with regard to the cap, “using the same approach as was used in the SFS” is likely to leave the Board’s concerns unaddressed.

c. “References” –

The work plan refers to two documents, the 2011 SFS and the 2006 FS. The Board repeatedly indicated that the two NRC reports should be used. The Board also referred to relevant information in the RI. Not using the 2 NRC reports and the RI, and the comments and recommendations the Board made using those three documents, is likely to result in a product that does not address the Board’s comments and recommendations contained in the February, March, April and May versions of the Board memo that was distributed to all members.

2. Work plan on Evaluation of the Use of Apatite/Phosphate Treatment Technologies.

a. “Introduction”

The work plan says: “EPA has asked the Respondents to evaluate the potential application of apatite and/or phosphate solutions for possible treatment of waste materials and/or groundwater. EPA requested that this evaluation be performed at a level of detail comparable to that used to evaluate the treatment technologies previously analyzed in the SFS.”

The Board discussed a range of possible treatment technologies during the review, and also in versions of the Board memo. Examples of draft recommendations include: 1) “Why aren’t we

undertaking dry soil separation? We understand that due to sulfates being present, solidification may not work. Since there are PTWs, per guidance, Region should explain why treatment is not occurring.” 2) “The Board notes that several treatment technologies were evaluated and screened out during the FS process., Whether the radioactive waste (change to RIM) resides in a heterogeneous or homogeneous distribution, volume separation techniques (volume reduction) and offsite disposal in a dedicated and regulated radioactive disposal unit may result in a more permanent remedy if short-term risks are minimized by engineering controls, personal protection equipment, or administrative controls, as well as if the radioactive waste is able to be physically sorted from the other waste in the landfill. If the radioactive waste can be detected and distinguished by emission signals and resides in distinct homogeneous layers, field screening techniques can be used for isolation followed by removal. If the waste resides in a more heterogeneous distribution, commercial sorting technologies, using multiple scanning spectroscopic techniques (that are used on DOE sites such as the MACTEC ScanSort process, or the EBERLINE Segmented Gate System) should be considered and evaluated. These processes could also be considered if a portion of the surface radioactive waste is planned to be consolidated under the final cover. The Board recommends that more explanation be provided for ruling out an in situ solidification/stabilization process specifically designed for both high sulfate content and saturated conditions as well as the separation techniques. The Board also recommends that the Region consider using S/S as a layer included in the cap design.” 3) “The Board notes that “treatment” can include measures taken to reduce volume, as well as solidification technologies designed to immobilize constituents of concern. The Board recommends that the Region develop an alternative based on a re-examination of potential treatment technologies that could be used at this site, including specifically methods of sorting through overburden and RIM to reduce the overall volume. This is especially true for the RIM in Area 2, since it appears that “construction fill” (as opposed to “sanitary” fill) was added to cover the contamination on this portion of the site, and Area 2 contains the majority of the RIM and overburden.” It is not clear why only apatite/phosphate treatment technology is being evaluated.

b. “Approach”

The work plan relies on literature search and discussions with DOE, rather than a bench scale or pilot approach geared to site-specific circumstances and actual RIM that is present at this site. It is not clear that the approach to be taken would yield useful information.

c. “Results of Preliminary Evaluations”

The work plan says: EPA previously determined that there is no unacceptable risk of groundwater contamination at the site. Specifically, the ROD contains the following conclusions:

1. *These (groundwater sampling) results are not indicative of on-site contaminant plumes, radial migration, or other forms of contiguous groundwater contamination that might be attributable to the landfill units being investigated. (ROD at p. 20)*
2. *The groundwater results show no evidence of significant leaching and migration of radionuclides from Areas 1 and 2. (ROD at p. 21)*
3. *Significant leaching and migration of radionuclides to perched water or groundwater have not occurred despite landfilled waste materials having been exposed to worst-case leaching conditions from surface water infiltration over a period of decades. (ROD at p. 21)*
4. *The lack of radionuclide contamination in groundwater at the Site is consistent with the relatively low solubility of most radionuclides in water and their affinity to adsorb onto the soil matrix. (ROD at p. 21)*
5. *This pathway for migration (groundwater flow to the river) is not considered significant under current conditions because the on-site impact to groundwater from the landfill units is so limited. (ROD at p. 21)*
6. *The fourth (remedial action) objective (Collect and treat contaminated groundwater and leachate to contain any contaminant plume and prevent further migration from the source area) is not applicable because a plume of contaminated groundwater beneath or downgradient of the disposal areas has not been identified. (ROD at p. 30)*

Consequently, groundwater was not determined to be a media of concern (i.e., no plume of groundwater contamination exists) and treatment of groundwater was not identified as a potential response action for the site in the prior FS or SFS.”

Board comments during the meeting and in draft versions of the memo both indicate that the Board did not necessarily agree with these statements in the ROD or find them persuasive (the 2008 ROD was not reviewed by the Board), and had concerns and recommendations regarding the approach taken for ground water contamination at this site, including: “Based on the information presented to the Board, it appears that there have been some samples of groundwater at this site that exceed standards considered as ARARs. The Region also stated that no discernable plume at this site has been identified, and its preferred approach is to continue monitoring groundwater. Generally, under existing Agency guidance, exceeding a maximum contaminant level in groundwater normally would warrant a response action (OSWER Directive 9355.0-30, *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions* and OSWER Directive 9283.1-33 *Summary of Key Existing EPA CERCLA Policies for Groundwater Restoration*). The Board recommends that the Region consider additional wells at the site to

better delineate the vertical and lateral extent of potential site-related contamination previously indentified from limited sampling in Area 1 and especially Area 2. These additional wells would be instrumental in clarifying the presence of an isolated groundwater hot-spot versus a groundwater plume in the complex subsurface geologic setting. The general recommendation is that the additional wells be nested along the western border (Crossroad property) of Area 2 in the unconsolidated alluvial deposits and the underlying fractured and vuggy, limestone Keokuk formation. In light of these facts, the Board notes that the Agency's long-standing policy has been that monitoring by itself is not a CERCLA remedial action, and believes that the information submitted to the Board may not support a conclusion that monitoring to evaluate effectiveness of the source control remedy (if that approach is selected) would constitute an effective or final ground water response action for this site. As such, the Board recommends that the decision documents clearly explain the role of monitoring in the Region's preferred approach, and indicate that any potential groundwater cleanup would be addressed in a separate decision document in the future representing a final ground water remedial action, should one be needed. In addition, the package at page 22 states that "Only four wells exhibited a total radium concentration above 5 pCi/l. These exceedances ranged from 5.74 pCi/l to 6.33 pCi/l. The slight exceedances are isolated spatially. Two of the four wells with total radium exceedances are located in areas that are not downgradient of either Radiological Area 1 or Radiological Area 2." The chart on page 21, however, indicates that there were two wells with exceedances and that the maximum detected concentration was 8 pCi/l. The Board recommends that the Region reconcile these discrepancies." Taking an approach based on these statements may lead to a result that does not address the Board's concerns and recommendations.

d. "References"

See comments above. Also, in the Technical References section, it appears that the documents listed may relate to potential use of apatite treatment technology for uranium contamination (for example, at Hanford); since this site involves radium contamination, it is not clear how relevant such documents would be.

3. Work plan on Alternative Area 2 Excavation Depths and Volumes.

a. "Introduction"

The work plan says: "EPA has asked that the volume of radiologically-impacted material (RIM) considered for possible excavation under the "complete rad removal" alternatives be revised to exclude deeper intervals in soil borings WL-210 and WL-235 in Area 2."

The Board during its discussions and deliberations during the meeting, and in drafts of the Board memo, was concerned that the "complete rad removal" approach being followed at this site overstated the volume and extent of contamination, as reflected by a number of statements

including: 1) “In addition, the SFS (p. 62) indicates that “the cleanup standards to be used for the development and evaluation of the ‘complete rad removal’ are background-based standards.” The SFS also appears to have used unrestricted land use in estimating the volume of RIM that would have to be removed under a “complete rad removal” scenario. The Region indicated that the West lake landfill property is zoned industrial/commercial, and will stay that way. The Board believes that using background-based standards and unrestricted use leads to unnecessarily overstating the volume of RIM that would have to be excavated and treated under a “complete rad removal” alternative. In particular, the Board notes that a “do not exceed” 5 pCi/gr approach throughout the landfill would be unreasonable and extreme (i.e., not every last molecule needs to be removed from the landfill), unless the reasonably anticipated future land use might be “residential,” which appears unrealistic.” 2) “In light of its other comments, the Board notes that it appears that the 500,000 cubic yards amount corresponding to the “complete rad removal” option likely overstates the volume and cost associated with a reasonable excavation remedy, especially where it appears feasible to separate out uncontaminated overburden material (e.g., construction debris).”

The work plan also says:” Although the RI raised possible questions about the representativeness of the downhole gamma logs for the deeper intervals of these two borings, a soil sample obtained from boring WL-210 detected the presence of total Thorium-230+232 at a depth of 40 ft bgs at a level (18.6 pCi/g) above the cleanup level (7.9 pCi/g) used to evaluate potential excavation alternatives. A duplicate sample obtained from this same depth interval contained total thorium at 11.6 pCi/g. These samples were obtained from a depth of 40 ft, 10 feet above the bottom of the borehole. In addition, these samples were obtained during drilling of the borehole, prior to the downhole logging activities that may have resulted in surficial material being knocked into the hole. Therefore, these sample results likely represent actual conditions at the 40 ft depth interval in boring WL-210. The RI sampling did not include collection of a soil sample from the deeper portion of the WL-235.”

The Board raised a number of concerns with the way the nature and extent of RIM at the site was characterized, and made several detailed statements on the subject, including: 1) “The Board is concerned that the data from these borings does not support the FS/SFS, the package, the ROD, and the Region’s findings and preferred approach.” 2) “The Board believes that these discrepancies are significant for many reasons. It appears that the specific boring data referred to by the Region may not accurately depict the actual scope and vertical extent of RIM at this site. The Board is concerned that inclusion of such inconsistent data negatively impact the alternatives evaluation process (including how the cost and feasibility of various implementation options have been evaluated), and led to a preferred alternative that may not be the most protective or cost effective. The RI and NRC data appear to suggest that most of the RIM is located closer to the surface of the landfill (i.e., within 10 feet). The Board recommends that the Region carefully re-consider and re-evaluate the data and information contained in the NRC and RI reports to ensure that the nature and extent of RIM are accurately characterized and

recommends that the Region re-evaluate potential alternatives based on the more likely location of RIM at the site. This re-evaluation should also consider the presence of hot spots that could be targeted for excavation. The Board believes that hot spot removal is consistent with ongoing cleanup of rad sites in several other Regions. Specifically, in Region 2, reduction of rad-impacted source material is being undertaken in a manner that is protective and without short-term impacts, where the Region determined that eliminating the source is an important objective of the cleanup. The Board notes that the cut-off levels (e.g., 100 pCi/gr, and especially 1000 pCi/gr) analyzed in the FS for identifying “hot spots” and evaluating excavation options (e.g., section 4.4.4.1.6 starting on page 83) appear to be out of step with EPA positions regarding protective cleanup decisions involving radioactive material at other sites, and inconsistent with HQ guidance provided to evaluate potential PTW at this site (e.g., “material with concentrations at or exceeding 79 pCi/gr of radium 226 and 228 combined, or 79 pCi/gr of thorium 230 and 232 combined”).”

The work plan, in the way it discusses WL-210 and WL-235, as well as thorium levels of 18.6 pCi/g and 11.6 pCi/g, does not appear to reflect an understanding of the full range of the Board’s concerns. One way to avoid misunderstanding the Board’s concerns would be to provide the early versions of the Board memo which went into more detail than later versions, so that there can be a clear and complete description of all of the comments and recommendations made based on the meeting.

b. “Approach”

The work plan says: “...consequently to eliminate removal of the deeper interval of RIM material from the southwestern portion of Area 2;” and “...revised cost estimates for excavation and offsite or onsite disposal based on exclusion of the potential deeper occurrences of RIM beneath the southwestern portion of Area 2.” These statements do not necessarily accurately reflect the Board’s comments and recommendations, and may lead to a result that does not address the Board’s concerns.

c. “Deliverables”

A number of statements are made in this section that may not necessarily accurately reflect the Board’s comments and recommendations, and may lead to a result that does not address the Board’s concerns.

d. “References” – see comments above.

4. Workplan on Additional Present Value Cost Estimates.

The Board’s comments and recommendations on this issue appear straightforward in the various versions. To the extent the work plan calls for deliverables that are based on “ the ROD-selected remedy and the two “complete rad removal” alternatives presented in the SFS” and does not

reflect Board comments and recommendations on those, it may lead to a result that does not address the Board's concerns.